



Maine Department of
Transportation
**Transportation Research
Division**



*Experimental Construction Project ME 00-20
Third Year Interim Report on Experimental
Utilization of Tire Shreds to Enhance Highway
Drainage
April 2003*

Transportation Research Division

Third Year Interim Report on Experimental Utilization of Tire Shreds to Enhance Highway Drainage

The tire shred drain appears to be performing well. The tire shreds apparently are providing a drainage path for groundwater throughout the winter and springtime conditions. Weather conditions, however, have not provided a substantial test of the system.

Introduction

In the summer of 2000 shredded tires were used in an experimental project on a full highway reconstruction project in the town of Rome. Shredded tires were used to construct a subgrade drain in the ditch profile. The picture at right shows the completed ditch and shoulder area during the spring of 2001. The French drain is located beneath the riprap on the road side of the ditch. This interim report documents temperature and water levels in the tire shred drain over time during the month of March 2003.



Figure 1.



Figure 2. Ice & Snow Remain in the Ditch Long After Other Areas Have Melted

Monitoring

The monitoring wells are located in several locations.



Figure 3.



Figure 4.



Figure 5. Digital Thermometer Connected to Thermocouple Leads



Figure 6. Measuring the Water Level in the Subsurface Drain

Results

The charts below show the results of the 2003 monitoring results. Despite generally deep frost penetration this past winter, the subsurface drain appeared to be functioning well during spring runoff.

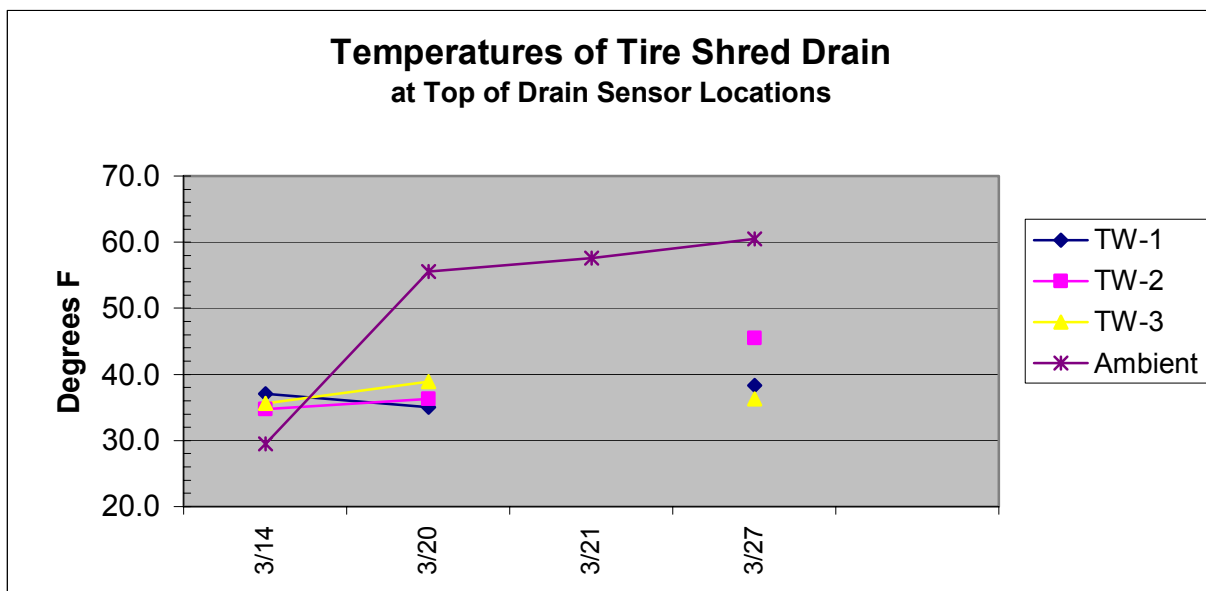


Figure 7.

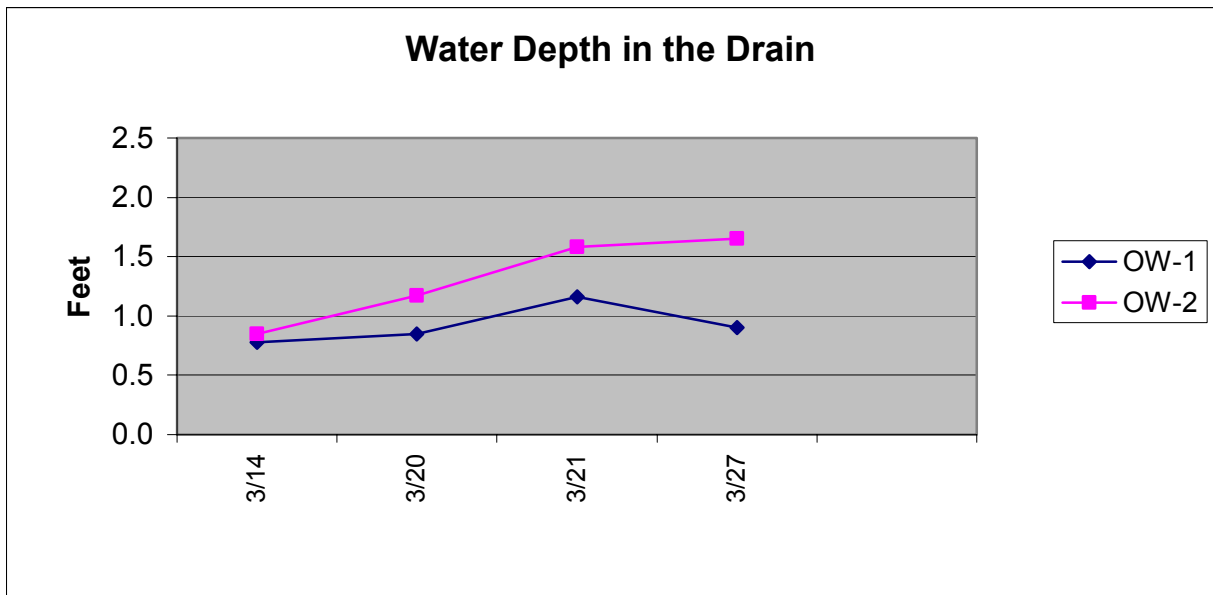


Figure 8.

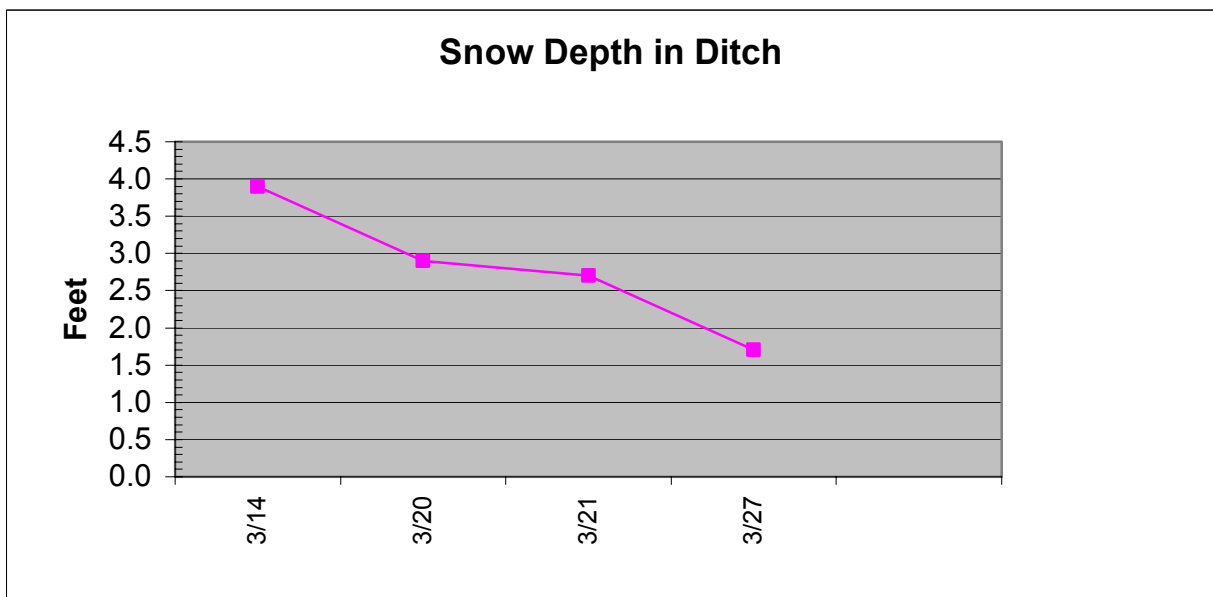


Figure 9.

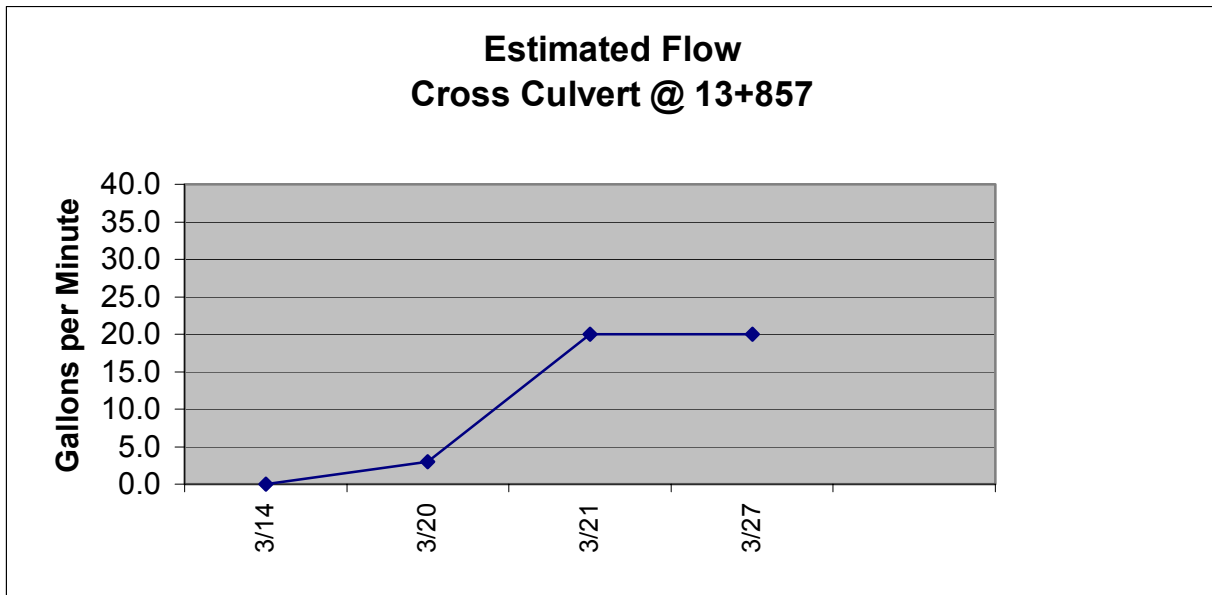


Figure 10.

One notable problem occurred at station 14 +330 where some ponding occurred in the ditch. A culvert plugged with ice prevented cross drainage. This problem does not appear to be related to the subsurface drain or the tire shreds, since all other adjacent drainage structures were functioning properly.



Figure 11.



Figure 12.



Figure 13



Figure 14.



Figure 15.



Figure 16.

Pavement Issues

A severe crack has developed in one lane adjacent to the experimental area. It is not known if this crack is directly related to the subsurface drain, since the drain was not underneath the travel way. It may be that it is related to post construction settling adjacent to the drain.



Figure 17



Figure 18



Figure 19.

Esthetic Considerations

Another problem that is of concern is the discoloration in the culvert discharge areas. The photos below show this phenomena. It is believed that it is due to iron bacteria or rust from the steel belts in the shredded tires. While this is not a water quality issue, it is an esthetic consideration. Although the discoloration does not appear to pose any hazard, MDOT staff feel this will limit the locations where tire shreds can be utilized in the future.



Figure 20. Rust Discoloration Visible on Soil & Rocks



Figure 21. Surface Deposits Caused by Iron Bacteria



Figure 22.

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Other Documents Available:

Construction Report 00-20, March 2001